

FORM PTO-1390

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

050212-0631

U.S. APPLIC. NO. (if known, see 37 CFR 1.5)
10/519,381

INTERNATIONAL APPLICATION NO

PCT/JP2004/011166

INTERNATIONAL FILING DATE

August 4, 2004

PRIORITY DATE CLAIMED

August 4, 2003

TITLE OF INVENTION
OPTICAL FIBERS

APPLICANTS FOR DO/EO/US

Eisuke SASAOKA, Yoshinori YAMAMOTO

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☐ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☒ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☐ The US has been elected (Article 31).
5. ☐ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is attached herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are attached hereto (required only if not transmitted by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendment has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ An English translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A preliminary amendment.
14. ☐ An Application Data Sheet under 37 CFR 1.76.
15. ☐ A substitute specification.
16. ☐ A power of attorney and/or change of address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 37 CFR 1.821-1.825.
18. ☐ A second copy of the published International Application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English translation of the International Application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information.
International Preliminary Examination Report

| | | | | | |
|---|--------------|---|------------|---|---------------------|
| U.S. APPLIC. NO. (if known, see 37 CFR 1.50) 10/519,381 | | INTERNATIONAL APPLICATION NO. PCT/JP2004/011166 | | ATTORNEY'S DOCKET NUMBER 050212-0631 | |
| | | | | CALCULATIONS | PTO USE ONLY |
| 21. <input checked="" type="checkbox"/> The following fees are submitted: | | | | | |
| <input checked="" type="checkbox"/> Basic National Stage Fee \$300 | | | | \$ | |
| 22. <input checked="" type="checkbox"/> Examination Fee If the written opinion prepared by ISA/US or the International preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4) All other situations | | | | \$0 \$200 | \$ |
| 23. <input checked="" type="checkbox"/> Search Fee (37CFR 1.492(b)) If the written opinion of the ISA/US or the International preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4) Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB All other situations | | | | \$0 \$100 \$400 \$500 | \$ |
| TOTAL OF 21, 22 and 23 = | | | | \$ | |
| <input type="checkbox"/> Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing or computer program listing filed in an electronic medium). The fee is \$250 for each additional 50 sheets of paper or fraction thereof. | | | | \$ | |
| Total Sheets | Extra Sheets | Number of each additional 50 or fraction Thereof (round up to a whole number) | RATE | | |
| -100 | /50= | | X\$250 | \$ | |
| Surcharge of \$130.00 for furnishing the oath or declaration later than 30 months from the earliest claimed priority date (37 CFR 1.492(e)). | | | | \$ | |
| CLAIMS | NUMBER FILED | NUMBER EXTRA | RATE | | |
| Total Claims | -20 = | | x \$50.00 | \$ | |
| Independent Claims | -3 = | | x \$200.00 | \$ | |
| Multiple dependent claim(s) (if applicable) | | | + \$360.00 | \$ | |
| TOTAL OF ABOVE CALCULATIONS = | | | | \$ | |
| <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. Fees above are reduced by 1/2. | | | | \$ | |
| SUBTOTAL = | | | | \$ | |
| Processing fee of \$130.00 for furnishing the English translation later than the 30 months from the earliest claimed priority date (37 CFR 1.492(f)). | | | | + | \$ |
| TOTAL NATIONAL FEE = | | | | | |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property | | | | + | \$ |
| TOTAL FEES ENCLOSED = | | | | \$ | |
| | | | | Amount to be refunded | \$ |
| | | | | Amount to be charged | \$ |
| <p>a. <input type="checkbox"/> A check in the amount of \$ _____ to cover the above fees is enclosed.</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. <u>500417</u> in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>500417</u>. A duplicate copy of this sheet is enclosed.</p> <p>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</p> <p>SEND ALL CORRESPONDENCE TO:</p> <p>Customer Number 20277 Telephone: 202.756.8000 Facsimile: 202.756.8087</p> <p style="text-align: right;">Date: June 13, 2006</p> <p style="text-align: center;">SIGNATURE Arthur J. Steiner NAME 26,106 REGISTRATION NUMBER</p> | | | | | |

THIS PAGE BLANK (USPTO)

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF TRANSMITTAL
OF COPIES OF TRANSLATION
OF THE INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY
(CHAPTER I OR CHAPTER II
OF THE PATENT COOPERATION TREATY)
(PCT Rules 44bis.3(c) and 72.2)

To:

HASEGAWA, Yoshiki
SOEI PATENT AND LAW FIRM
Ginza First Bldg.
10-6, Ginza 1-chome
Chuo-ku, Tokyo 1040061
JAPON

RECEIVED
JUN 5 26
2006

| | |
|--|---|
| Date of mailing (day/month/year) 18 May 2006 (18.05.2006) | |
| Applicant's or agent's file reference FP04-0272-00 | IMPORTANT NOTIFICATION |
| International application No. PCT/JP2004/011166 | International filing date (day/month/year) 04 August 2004 (04.08.2004) |
| Applicant SUMITOMO ELECTRIC INDUSTRIES, LTD. et al | |

1. Transmittal of the translation to the applicant.



The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter I).



The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter II).

2. Transmittal of the copy of the translation to the designated or elected Offices.

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following designated or elected Offices requiring such translation:

None

The following designated or elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

AE, AG, AL, AM, AP, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EA, EC, EE, EG, EP, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OA, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

3. Reminder regarding translation into (one of) the official language(s) of the elected Office(s).

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability (Chapter II).

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned within the applicable time limit (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.



| | |
|---|---|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland | Authorized officer Masashi Honda |
| Facsimile No. +41 22 740 14 35 | Facsimile No. +41 22 338 70 10 |

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

| | | | |
|--|---|---|------------------|
| Applicant's or agent's file reference FP04-0272-00 | FOR FURTHER ACTION | | Sec item 4 below |
| International application No. PCT/JP2004/011166 | International filing date (day/month/year) 04 August 2004 (04.08.2004) | Priority date (day/month/year) 04 August 2003 (04.08.2003) | |
| International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237 | | | |
| Applicant SUMITOMO ELECTRIC INDUSTRIES, LTD. | | | |

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).
2. This REPORT consists of a total of 10 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Box No. I | Basis of the report |
| <input checked="" type="checkbox"/> Box No. II | Priority |
| <input type="checkbox"/> Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input checked="" type="checkbox"/> Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> Box No. VI | Certain documents cited |
| <input type="checkbox"/> Box No. VII | Certain defects in the international application |
| <input checked="" type="checkbox"/> Box No. VIII | Certain observations on the international application |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis.2).

| | |
|---|---|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 740 14 35 | Date of issuance of this report 08 May 2006 (08.05.2006) |
| | Authorized officer Masashi Honda Telephone No. +41 22 338 70 10 |

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing
(day/month/year)

Applicant's or agent's file reference

FP04-0272-00

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/JP2004/011166

International filing date (day/month/year)

04.08.2004

Priority date (day/month/year)

04.08.2003

International Patent Classification (IPC) or both national classification and IPC

Applicant

SUMITOMO ELECTRIC INDUSTRIES, LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JP

Authorized officer

Facsimile No.

Telephone No.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/011166

Box No. 1

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/011166

Box No. II

Priority

1. ☐ The following document has not yet been furnished:☐ copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)).☐ translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date in the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

The subject matters of claims 9-16, and those of claims 17-19 referring to claim 9 or 12, are described in patent application no. 2003-427765 (filed earlier on 24 December, 2003 (24.12.03)) of the two prior patent applications that are claimed to be the ground for the claimed priority of the present application; and therefore, the priority date for claims 9-16, and claims 17-19 referring to claim 9 or 12, is 24 December, 2003.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/JP2004/011166

Box No. IV Lack of unity of invention

1. ☐ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has:
- ☐ paid additional fees
- ☐ paid additional fees under protest
- ☐ not paid additional fees
2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with
- ☒ not complied with for the following reasons:

Claims 1-19 have a common feature (hereinafter, referred to as "the first common feature") as "fiber optics composed mainly of quartz glass, having a core area extending along a specified axis and a clad area provided around the outer periphery of the said core area". Since, however, the first common feature is well known without need of giving examples and makes no contribution over the prior art, it is not a special technical feature in the meaning of the second sentence of PCT Rule 13.2. There, therefore, exists no special technical feature common to all of claims 1-19, and hence claims 1-19 apparently do not satisfy the unity of invention.

The inventions are divided into

- (1) Claims 1-18 and claims 17-19 referring to claim 1 that relate to fiber optics as the said first common feature that have a cable cutoff wavelength of not more than 1260 nm, a transmission loss of not more than 0.32 dB/km at a wavelength of 1310 nm, and an increase in loss due to an OH group of not more than 0.3 dB/km at a wavelength of 1380 nm, claims 1-8 and 17-19 referring to claim 1 being a group of inventions (hereinafter, referred to as "the first invention group") so linked as to form a single general inventive concept, in the above-mentioned feature;
- (2) Claims 9-11 and 14-19 referring to claim 9 that relate to fiber optics as the said first common matter that have a cable cutoff wavelength of not more than 1260 nm, a mode field diameter of not more than 9 μm at a wavelength of 1310 nm, and a dispersion slope of not more than 0.055 ps/nm²/km at a wavelength of 1550 nm, claims 9-11 and 14-19 referring to claim 9 being a group of inventions (hereinafter, referred to as "the second invention group") so linked as to form a single general inventive concept, in the above-mentioned feature; and
- (3) Claims 12, 13 and 14-19 referring to claim 12 that relate to fiber optics as the said first common matter that have a mode field diameter of not more than 9 μm at a wavelength of 1310 nm, and a dispersion slope of not more than 0.082 ps/nm²/km at a zero-dispersion wavelength, claims 12, 13 and 14-19 referring to claim 12 being a group of inventions (hereinafter, referred to as "the third invention group").

4. Consequently, this opinion has been established in respect of the following parts of the international application:
- ☒ all parts
- ☐ the parts relating to claims Nos. _____

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/JP2004/011166

| | | | |
|---|---|----------------|-----|
| Box No. V | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | | |
| 1. Statement | | | |
| Novelty (N) | Claims | 1-8, 14-16, 18 | YES |
| | Claims | 9-13, 17, 19 | NO |
| Inventive step (IS) | Claims | | YES |
| | Claims | 1-19 | NO |
| Industrial applicability (IA) | Claims | 1-19 | YES |
| | Claims | | NO |
| 2. Citations and explanations: | | | |
| <p>Document 1: WO, 2000-31573, A1 (Sumitomo Electric Industries, Ltd.), 2 June, 2000 (02.06.00), page 30, line 17 to page 31, line 17, page 43, lines 1-16, Figs. 2, 11, 15 and 16; JP, 2000-221352, A; US, 6266467, B1; US, 2002-12511, A1; US, 2003-77057, A1; and EP, 1146358, A1</p> <p>Document 2: The Loss Characteristics of Ultra-Low-Loss Pure Silica Core Single-Mode Fibers, (Hiroshi Yokota, et al.), Proceeding of national Convention of the Institute of Electronics and Communication Engineers of Japan of 1986, 5 March, 1986 (05.03.86), pages 4-262</p> <p>Document 3: JP, 2-217329, A (Sumitomo Electric Industries, Ltd.), 30 August, 1990 (30.08.90), particularly, Examples 1 and 2, Fig. 3; JP, 3-131544, A; JP, 4-119939, A; EP, 529694, B; EP, 405580, A2; US, 5106401, A; and US, 5306322, A</p> <p>Document 4: JP, 1-224706, A (Sumitomo Electric Industries, Ltd.), 7 September, 1989 (07.09.89), full text, Figs. 1-4, (Family: none)</p> <p>Document 5: JP, 11-326670, A (Sumitomo Electric Industries, Ltd.), 26 November, 1999 (26.11.99), paragraphs [0010] and [0011], Fig. 1, (Family: none)</p> <p>Document 6: EP, 1329750, A2 (Sumitomo Electric Industries, Ltd.), 23 July, 2003 (23.07.03); and JP, 2003-279780, A</p> <p>Document 7: JP, 2003-84163, A (Sumitomo Electric Industries, Ltd.), 19 March, 2003 (19.03.03), paragraphs [0014]-[0021], Figs. 1-11; and US, 2003-147610, A1</p> <p>Document 8: JP, 2003-255169, A (The Furukawa Electric Co., Ltd.), 10 September, 2003 (10.09.03), full text, Figs. 1-12; JP, 2003-232952, A; and US, 2003-210878, A1</p> <p>Document 9: Ultra-Low-Loss (0.151 dB/km) Pure Silica Core Fiber and Extension of Transmission Distance, (Katsuya Nagayama, et al.), Study Report of the Institute of Electronics, Information and Communication Engineers, 14 June, 2002 (14.06.02), Vol. 102, No. 135 (OCS 2002-31 to 36), pages 1-6</p> <p>Document 10: Ultra-Low-Loss (0.1484 dB/km) Pure Silica Core Fiber and Extension of Transmission Distance, (Katsuya Nagayama, et al.), Electronics Letters, 26 September, 2002 (26.09.02), Vol. 38, No. 20, pages 1168-1169</p> <p>Document 11: Ultra-Low-Loss (0.151 dB/km) Fiber and its Impact on Submarine Transmission Systems, (Katsuya Nagayama, et al.), Optical Fiber Communication Conference (OFC 2002), Postdeadline Papers, March 2002, paper FA10-1 to FA10-3</p> <p>Claims 1-8</p> <p>The subject matters of claims 1-8 do not appear to involve an inventive step in view of documents 1-6 cited in the ISR.</p> <p>Example 13 of document 1 in page 30, line 17 to page 31, line 17 describes fiber optics having a core area of pure silica and a clad area of silica with fluorine added thereto, wherein (a) the said fiber optics has a cutoff wavelength of 1.04 μm, (b) it has only one zero-dispersion wavelength in the range of 1.20-1.60 μm, (c) the dispersion slope at the said zero-dispersion wavelength is 0.057</p> | | | |

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/JP2004/011166

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability:
citations and explanations supporting such statement

ps/nm²/km, (d) the dispersion slope at a wavelength of 1.55 μ m is 0.048 ps/nm²/km, (e) the dispersion at a wavelength of 1.55 μ m is 7.1 ps/nm/km, (f) the transmission loss at a wavelength of 1.55 μ m is 0.17 dB/km, which is lower than that of fiber optics with a core area having Ge added, and (g) the bending loss at a wavelength of 1.55 μ m is 0.04 dB per turn when the fiber optics is wound to be 32 mm in diameter. Document 1 mentions in page 43, lines 1-16, that, in the above-mentioned Example 13, the transmission loss at a wavelength of 1.38 μ m due to OH absorption can be reduced from 0.3 dB/km to not more than 0.01 dB/km by means of sufficient dehydration treatment. According to Fig. 15 of document 1, the transmission loss is 0.3-0.4 dB/km at a wavelength of 1310 nm, and 0.3 dB/km at a wavelength of 1380 nm; however, as described in documents 2 and 3, fiber optics having the same structure as those of document 1 that have a lower transmission loss of not more than 0.30 dB/km at a wavelength of 1310 nm are well known. Accordingly the subject matters of claims 1-4 do not appear to involve an inventive step.

In document 1, the zero-dispersion wavelength is to be chosen from a range of 1.20-1.60 μ m as required according to the purpose, which includes a range of zero-dispersion wavelength of 1300-1324 nm. Actually, fiber optics having the same structure as those of document 1 that have a zero-dispersion wavelength of about 1300 nm are well known, as described in documents 2, 3, etc. Accordingly the subject matter of claim 5 does not appear to involve an inventive step.

Document 5 mentions in paragraphs [0010] and [0011] that fiber optics having a core area of pure silica and a clad area of silica with fluorine added thereto have a lower polarization-mode dispersion (0.15 ps/km^{1/2} at a wavelength of 1.55 μ m) than fiber optics having a core with Ge added thereto, because the former has a lower difference in the thermal coefficient of expansion between the core area and the clad area. It is recognized that the same applies to those of document 1. Accordingly the subject matter of claim 6 does not appear to involve an inventive step.

Document 6 mentions that the Petermann-I mode field diameter at a wavelength of 1550 nm is made not more than 10.0 μ m, and the bending loss at a wavelength of 1550 nm for a bending diameter of 20 mm is made not more than 3 dB/m. It would be easy to do the same to fiber optics described in document 1. Accordingly the subject matters of claims 7 and 8 do not appear to involve an inventive step.

Claims 9-11

The subject matters of claims 9-11 are described in documents 7 and 8, cited in the ISR, and so, do not appear to be novel or involve an inventive step. The said subject matters also do not appear to involve an inventive step in view of documents 1 and 6. In the first working form in document 7, the mode field diameter of 9.4 μ m contained in Fig. 8 is for a wavelength of 1.55 μ m; and therefore, it is recognized that the mode field diameter at a wavelength of 1310 nm does not exceed 9 μ m. In Table 1 in paragraph [0063] of document 8, the mode field diameter, MFD, is not more than 9 μ m at a wavelength of 1.55 μ m, and therefore, it is naturally smaller at a wavelength of 1310 nm.

A constitution wherein the mode field diameter at a wavelength of 1310 nm is made not more than 9 μ m is well known, as described in document 6, etc., and it would be easy to make the same constitution in fiber optics described in document 1.

Claims 12 and 13

The subject matters of claims 12 and 13 are described in documents 6 and 8, and so, do not appear to be novel or involve an inventive step. The said subject matters do not appear to involve an inventive step in view of document 1 and document 6 or 8. In Fig. 5 of document 6, the dispersion slope at the zero-dispersion wavelength is approximately 0.06 ps/nm²/km. In document 8, it is apparent in Figs. 4-6 that the dispersion slope at the zero-dispersion wavelength is not more than 0.080 ps/nm²/km. It would be easy to make the dispersion slope at the zero-dispersion wavelength in the fiber optics of document 1 as such values.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/011166

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

Claims 14 and 15

The subject matters of claims 14 and 15 do not appear to involve an inventive step in view of document 1-3, any of documents 9-11 cited in the ISR, and any of documents 6-8. It would be easy to make the transmission loss of fiber optics described in any of documents 6-8 as low as those described in any of documents 2, 3 and 9-11, and also to reduce the transmission loss of such fiber optics as described in document 1 at a wavelength of 1.38 μm due to OH absorption by sufficiently dehydrating them. It would be easy to make the transmission loss of the fiber optics of document 1 as low as those described in documents 2 and 3, and also, to make the mode field diameter at a wavelength of 1310 nm of the said fiber optics not more than 9 μm similar to those described in documents 6-8.

Claim 16

The subject matter of claim 16 does not appear to involve an inventive step in view of documents 1, 2, 4 and 6-8. In document 1, the zero-dispersion wavelength is to be chosen from the range of 1.20-1.60 μm according to the purpose, which includes a range of zero-dispersion wavelength of 1300-1324 nm. A constitution wherein the zero-dispersion wavelength is made approximately 1300 nm is well known as described in document 2, 4, etc.

Claims 17 and 18

The subject matter of claim 17 is described in document 8 cited in the ISR, and so, does not appear to be novel or involve an inventive step. The subject matters of claims 17 and 18 do not appear to involve an inventive step in view of documents 1-11. A second core layer 2 with fluorine added thereto in document 1 is considered as an inner clad layer. In document 1, optical fibers have a core area of pure silica and a clad area of silica with fluorine added thereto. It would be easy to make fiber optics having a core area of pure silica and a clad area of silica with fluorine added thereto in document 6-8, as such fiber optics described in any of documents 1-5 and 9-11.

Claim 19

The subject matter of claim 19 is described in document 7, and so, does not appear to be novel or involve an inventive step. The said subject matter does not appear to involve an inventive step in view of documents 1, 2, 4 and 6-8. A constitution wherein the outer diameter of a core is made 7.5-8.6 μm is well known as described in documents 2, 4, 7, etc. A constitution wherein the ratio of the specific refractive index of the core area to that of the clad area is made 0.36%-0.42% is well known as described in documents 4, 5 and 7.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/011166

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Fig. 8 states that, in sample C, Δn is 0.935 (%), and MFD at 1310 nm is 8.06 (μm). However, Example B in Fig. 4 of patent application no. 2003-427765, recognized as corresponding to the said sample C, the patent application being the ground for the claimed priority of the present application, states that Δn is 0.395 (%), and MFD at 1310 nm is 8.60 (μm). In sample C, it is recognized that Δn is 0.395 (%) and MFD at 1310 nm is 8.60 (μm) correctly.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/011166

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

IV. 3.

The first invention group and the second invention group have the common feature as "having a cable cutoff wavelength of not more than 1260 nm" in "fiber optics as the said first common feature" (hereinafter, referred to as "the second common feature"). The second common feature, however, is also well known without need of giving examples.

The second invention group and the third invention group have the common feature as "having a mode field diameter of not more than 9 μm at a wavelength of 1310 nm" in "the fiber optics as the said first common feature" (hereinafter, referred to as "the third common feature"). The third common matter, however, is also well known as described, for example, in documents: EP, 1329750, A2 (Sumitomo Electric Industries, Ltd.), 23 July, 2003 (23.07.03), and JP, 2003-279780, A.

Consequently, there exist no features common to the first through third invention groups that can be considered to be a special technical feature in the meaning of the second sentence of PCT Rule 13.2.

The number of different inventions contained in the present international application is three.